

REMARKS

Claim 10 was amended to correct typographical errors. No claim was amended to overcome the rejection of the Office Action.

The present invention allows a transmission unit to resume transmission of the video data in an efficient manner to a reception terminal after temporarily interrupting transmission of the video data with minimal disruption to a viewer of the video data, such as a delayed display and/or distorted images. The present invention determines whether a frame to be transmitted after resuming transmission of the video data should be transmitted or if it should be replaced with a substitute I frame. The substitute I frame is transmitted when the frame references a frame which has not been transmitted.

For example, a material judgment unit determines whether the reference frame of the frame has already been transmitted. If it has not been transmitted, then the frame is replaced with a substitute I frame. Otherwise, if the reference frame has been transmitted, then the frame is transmitted. This ensures that the frames are not unnecessarily replaced, but instead replaced when necessary to ensure a smooth playback of the video data. (Pg. 31, ln. 6 – Pg. 33, ln. 10)

The Office Action rejected Claims 1, 11, 13, 16, and 18 under 35 U.S.C. § 103 as being obvious over *Satoda* (U.S. Pat. Pub. No. 2002/0147980) in view of *Muller* (U.S. 6,031,574), *Sugimoto* (U.S. 5,650,829), and *Bourne* (WO 03/007613)

With respect to Claim 1, neither *Satoda*, *Muller*, *Sugimoto*, nor *Bourne* teach or suggest

[A] transmission unit transmitting the video data and the substitute I frame data to the plurality of reception terminals, and when the transmission unit is to resume transmission of the video data to one of the reception terminals after temporarily interrupting transmission of the video data to the reception terminal, the transmission unit checks whether a reference frame of a frame to be transmitted after resuming transmission of the video data has

been transmitted or not, and if the reference frame has not been transmitted, transmits the substitute I frame data to the reception terminal for the frame for which the reference frame has not been transmitted before resuming transmission of the video data.

(emphasis added) There is no indication in *Satoda*, *Muller*, or *Sugimoto* of transmitting substitute I frames when the reference frame has not been transmitted and cites to *Bourne* for the features of the present invention.

Furthermore, *Bourne* also does not teach the features of the present invention. *Bourne* is a video transmission system which provides surveillance on band-limited multiplexed channel in a faster manner without sacrificing the spatial image resolution of the object. (Abstract)

As seen in FIG. 6 the encoder checks to see whether an intra-coded frame has already been transmitted to the decoder. If an intra-coded frame has not been transmitted to the decoder in this session, an intra-coded frame is transmitted to initiate the session. (Pg. 17, lns. 24 – 31). However, subsequent inter-coded frames after the initial frame, such as P-frames, are then transmitted by the decoder. (Pg. 18, lns. 12 – 15) Thus, in *Bourne*, only a single intra-coded frame is transmitted to begin the session and subsequent frames are normally transmitted, including P-frames which may reference frames which have not been transmitted. For example, in *Bourne*, subsequent P-frames which reference frames have not been transmitted are not substituted for an intra-coded frame. This can lead to the initial frame being viewable, but subsequent frames being unviewable.


In contrast, in the present invention, a frame to be transmitted is analyzed to determine whether its reference frame has already been transmitted or not. If the frame has not been transmitted, then a substitute I frame is transmitted. This occurs for multiple frames instead of just a single frame at the beginning. For example, the process can be continued, for example,

until I frame data of the next GOP appears. (Pg. 33, lns. 11 – 14) This ensures that the video can still be played back instead of just a single frame.

For example, during a switch from an on-demand video to broadcast video, a material judgment unit 152 determines whether to replace the frames of the broadcast video data with substitute I frame data. (Pg. 30, lns. 6 – 18) If the material judgment unit 152 determines that the frame is an I frame, then it is unnecessary to replace the frame with a substitute I frame because the frame and the subsequent frames can be decoded correctly by the user terminal 18. (Pg. 31, lns. 6 – 15) However, if the material judgment unit 152 determines that the frame being judged is a P or B frame, the material judgment unit 152 checks whether the reference frame of the judged frame has been transmitted to the user terminal 18. If the reference frame of the judged frame has been transmitted to the user terminal 18, then the judged frame can be played properly and is not replaced with a substitute I frame. (Pg. 31, ln. 6 -15) Otherwise, the substitute I frame is transmitted since the reference frame for the P or B frame is not transmitted, and thus the P or B frame would be played incorrectly. As can be seen, the transmission of substitute I frame data is not limited to just a single frame, but can continue until the I frame of the next GOP is transmitted.

Differences between the present invention and *Bourne* can be seen in the chart shown below:

KEY

 = (frames which are not transmitted)

underlined = frames which are not viewable

frame (reference frame) = frames which refer to frames which have not been transmitted, with the reference frame in parenthesis.

CHART

Video 1	I-1	P-1	P-2	P-3	P-4	I-2	P-5	P-6
Video 2	I-3	P-7	<u>P-8 (P-7)</u>	<u>P-9 (P-7)</u>	<u>P-10 (P-7)</u>	I-4	P-11	P-12
Bourne	I-1	P-1	I-8	<u>P-9 (P-7)</u>	<u>P-10 (P-7)</u>	I-4	P-11	P-12
Present Invention	I-1	P-1	I-8	I-9	I-10	I-4	P-11	P-12

In the chart, Video 1 is the video prior to switching, while Video 2 is the video after switching in conventional systems. In Video 1, I-1 and P-1 are transmitted, but P-2, P-3, P-4, I-2, P-5, and P-6 are not transmitted. For Video 2, I-3 and P-7 are not transmitted, but P-8, P-9, P-10, I-4, P-11, and P-12 are transmitted. As can be seen, frames P-8, P-9, and P-10 reference frame P-7. However, frame P-7 was not transmitted and thus the frames P-8, P-9, and P-10 are not displayed correctly. *Bourne's* solution is to detect that the initial frame in Video 2 is not an intraframe, and to thus transmit frame I-8. *Bourne* then resumes normal transmission of the frames. As such, frames P-9 and P-10 are transmitted, like the conventional system. Again, like the conventional system, frames P-9 and P-10 refer to P-7. However, since frame P-7 is not transmitted, frames P-9 and P-10 will be displayed incorrectly and be unviewable.

In contrast, in the present invention, the material judgment unit 152 reviews the transmission for Video 2 and determines that frame P-8 references frame P-7. Frame P-7 is not transmitted to the user terminal 18 and thus, the frame I-8 is transmitted. However, the material judgment unit 152 also analyzes the frames P-9 and P-10. The material judgment unit 152 will determine that the frames P-9 and P-10 reference frame P-7, which is not transmitted to the user terminal 18. Thus, in the present invention, the frame I-9 and I-10 instead of P-9 and P-10 are transmitted to the user terminal 18. Since frame I-4 is an intra-frame, there is no need to replace the frame I-4. (Pg. 31, ln. 16 – Pg. 33, ln. 17)

As noted in the MPEP at §2143.02:

A rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 (2007); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950). (underline added)

All arguments for patentability with respect to Independent Claim 1 are repeated and incorporated herein for Independent Claims 11, 13, and 16.

The Office Action rejected Claims 21 and 22 as being obvious over *Satoda*, *Muller*, *Sugimoto*, *Bourne*, and *Lin* (U.S. 6,738,980).

All arguments for Independent Claim 1 are repeated and incorporated for Dependent Claims 21 and 22. Furthermore, *Lin* does not remedy the deficiencies of *Satoda*, *Muller*,

Sugimoto, and *Bourne*. Claims 21 and 22 depend from Independent Claim 1 and are thus allowable, too.

The Office Action rejected Claims 2-7, 9, and 19 under 35 U.S.C. § 103 as being obvious over *Kunkel* (U.S. 7,100,183) in view of *Satoda*, *Muller*, *Sugimoto*, and *Bourne*.

All arguments for patentability with respect to Independent Claim 1 are repeated and incorporated herein for Independent Claim 2.

Kunkel also does not remedy the deficiencies of *Satoda*, *Muller*, *Sugimoto*, and *Bourne*. The Office Action on Pages 25 and 26 admit that *Kunkel* does not teach or suggest

[T]he transmission unit checks whether a reference frame of a frame to be transmitted after resuming transmission of the video data has been transmitted or not, and if the reference frame has not been transmitted.

Furthermore, *Kunkel* continuously sends I frames, and not when the reference frame has not been transmitted. (Col. 7, lns. 10 – 17)

In addition, *Kunkel* would teach away from *Bourne*. *Kunkel* teaches continuously sending I frames while *Bourne* teaches only sending a single I frame.

[I]t is generally settled that the change in prior art device which makes the device inoperable for its intended purpose cannot be considered to be an obvious change.

Hughes Aircraft Co. v. United States, 215 U.S.P.Q. 787, (Ct.Cl. Trial Div. 1982)

Dependent Claims 3 – 6, 9, and 19 depend from Claim 19 and are thus allowable, too.

The Office Action rejected Claims 10 and 17 under 35 U.S.C. § 103 as being obvious over *Satoda*, in view of *Sugimoto* and *Bourne*.

All arguments for Independent Claim 1 are repeated and incorporated herein for Independent Claims 10 and 17.


Dependent Claims 3 – 7, 9, and 18 - 22 depend from and further define Independent Claims 1 and 2 and are thus allowable, too.

It is believed that the case is now in condition for allowance and an early notification of the same is requested.

If the Examiner believes that a telephone interview will assist in the prosecution of this case, the undersigned attorney can be reached at the listed telephone number.

Very truly yours,

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